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1. Introduction

The complex rearrangement of vowels known as the Northern Cities Chain Shift, or simply the Northern Cities Shift (NCS), surely ranks among the most intriguing phonological discoveries of modern sociolinguistics. The shift is remarkable for its broad influence across both geographical and phonological space. As for the former, evidence of the shift has been documented as far east as New England and as far west as the Mississippi River, though most research has been focussed on a few large cities including Chicago, Detroit, Buffalo and Rochester. In terms of phonological space, the impact is also great, with recent reports claiming that as many as six vowels are affected. These vowels and the changes they are reportedly undergoing are shown in Figure 1 which provides a fairly standard representation of the shift.

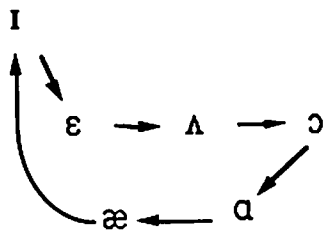

Fig. 1: The Northern Cities Shift (after Labov 1994)

The relationship of the vowels affected by the NCS and the directions in which they appear to be changing have suggested to researchers that the changes are coordinated and are operating as part of a chain shift. The chain shift model is one adopted from historical linguistics and describes a situation in which movement of one vowel triggers movement in another, which in turn may trigger others in a sort of chain reaction. The apparent relatedness of the individual elements in the shift is

made quite evident by their portrayal in diagrams like Figure 1. When the changes are represented in this way, it appears that the basic movement of the NCS is a clockwise rotation with the vowels linked into a complete circuit. It is important to keep in mind, however, that the neat pattern presented in Figure 1 provides a very simplified and abstracted picture of what are in actuality rather complex and murky phonetic details.

The present paper explores a little corner of this phonetic murk by considering evidence that the directions available to the shifting vowels are not limited to those mapped in Figure 1. I will concentrate here on the movement of three vowels: the high front (I), the mid front (ɛ) and the mid central (ʌ). The focus is placed on these vowels, because each appears to be participating in a broader range of variation than is commonly acknowledged by researchers. The nature of this variation raises questions about the forces driving the shift, specifically about whether chain shifting is an appropriate model to describe the NCS changes, and the paper concludes by briefly addressing some of the implications of the current findings in these terms.

2. Project Description

The data presented here are taken from an on-going research project in Michigan. The goal of the project is to investigate questions related to the diffusion of the NCS, with specific focus on how the shift spreads beyond urban centers into smaller communities. Standard accounts of the shift, like Labov, Yaeger and Steiner (1972) and Labov (1994), were developed by examining the speech of large urban populations and very little attention has been given to the status of the NCS in the communities that lie between the cities. The TELSUR project that is currently underway at the University of Pennsylvania promises to help fill some of these gaps by providing a more detailed map of the geographic distribution of the NCS and other vowel patterns.

The present project also seeks to provide information on the status of the NCS outside the major cities and does so by sampling speakers from two small towns of approximately 3,500 residents each. The towns were selected because they find themselves in a sociolinguistically interesting position. While they are traditional small towns in many respects (and this

aspect of their identity is often emphasized by community members), they are both located roughly 20 miles from a mid-sized city and the residents of the towns travel frequently to these cities for shopping, entertainment, and in some cases business. Both towns have easy access to Interstate 94, the main route linking Chicago and Detroit, though one is located in western Michigan (approximately 120 miles from Chicago) and one in eastern Michigan (approximately 60 miles from Detroit).

In each location sixteen speakers are sampled with equal numbers of men and women in each of two age groups (16-20 yrs. and 40-55 yrs.). The primary speech data were collected through relatively informal interviews, though this unscripted speech was supplemented by the reading of a rather lengthy word list (containing 242 items). The data discussed here are taken from the interview-style speech of nine speakers from the west Michigan town being investigated. Tokens of the vowels were coded on the basis of auditory judgments, though fans of formant frequency measures can rest assured that my future research plans include some instrumental analysis of the vowels.

3. Vowels with Variable Trajectories

3.1. The (ɛ) Variable

Turning to the question at hand which is whether the directions indicated in Figure 1 are the only ones taken by shifting vowels, I would like to begin by examining the evidence related to the mid front (ɛ).

Of the three vowels being considered here, (ɛ) is the only one for which different routes have been discussed in the literature. Thus, while Labov (1994) now seems to hold the backing tendency to be primary for this vowel, in their original formulation of the NCS, Labov, Yaeger and Steiner (1972) described the movement of (ɛ) as one of lowering to something near a low front [æ]. Labov (1994:196) suggests that this discrepancy represents a diachronic development in the shift where the initial lowering tendency is being replaced by a backing rule. Eckert (1991), on the other hand, suggests that the difference of lowering versus backing is characteristic of a synchronic Chicago versus Detroit distinction. Unfortunately,

sufficient evidence has not been offered to support either of these claims, and in fact to some extent the data seem to contradict both accounts, as it appears that both variants are still available in both locations.

In the present study the overwhelming majority of shifting in (ɛ) items involves backing, though the lowering tendency has also been observed with respectable frequency. In addition, several tokens of (ɛ) were found to be both lowered and backed, an apparent compromise tendency that has also been reported by both Labov (1994:192) and Eckert (1991). Data on the relative frequencies of the three shifted variants of (ɛ) are presented in Table 1.

Table 1: Frequency of shifted (ɛ) variants (total n=946).

	[ɛ˃]	[ɛ˟]	[ɛ˃˟]	Total
number:	222	46	17	285
% of all (ɛ):	23.5 %	4.9 %	1.8 %	30.1 %
% of shifted:	77.9 %	16.1 %	6.0 %	

This table gives the frequency information for each variant as a percentage of the total number of (ɛ) tokens examined across 9 speakers, which was 946. So for example, we see that out of the 946 tokens, I found 222 that were backed, and this represents 23.5% of the total. The last column in the table indicates the overall rate of shifting for this variable (i.e the number of (ɛ) items that were shifted in any direction), and here we see that this vowel was shifted just over 30% of the time. The frequency of each of the three shifted variants is also expressed as a percentage of the total number of innovative tokens (285) and these figures are found in the bottom row (e.g. the 222 cases of backing represent 77.9% of the shifted tokens). So, Table 1 indicates that backing is the preferred direction of shifting for this vowel; however, it also shows that alternative trajectories are possible and merit further consideration.

As a first crack at such further consideration I would like to explore the possiblity that the variant trajectories are conditioned phonologically. Toward this end I have compiled lists of the lexical items in which shifted variants appeared. These lists appear as Tables 2(a-c). The words are broken down into 6 groups based on the type of consonant that follows the

shifted vowel. As indicated by the headings, the categories of consonants are voiceless and voiced stops, voiceless and voiced fricatives, the lateral /l/ and nasals.

Table 2(a): Distribution of backed variants of (e)

Voiceless Stops (n=13)			
athletic	election (2)	let (2)	neglect
pep	preterite	separate	sweater (2)
threatened	yet		
Voiced Stops (n=13)			
already	credit (2)	ed	instead
pregnant	red (2)	said (4)	says
Voiceless Fricatives (n=20)			
definitely (2)	Ethel	freshman (2)	left (3)
less (2)	questions	semester (3)	test (2)
west (3)	wrestling		
Voiced Fricatives (n=25)			
ever	every (3)	everyone (2)	everything (4)
everywhere	never (6)	seventeen (3)	seventy
several	weather (2)	whatever	
Lateral /l/ (n=58)			
celebrate	development	else (2)	felt
help (8)	itself (2)	smell	tell
well (41)			
Nasals (n=93)			
central	December	dependent	depends
elementary (2)	expense	French (2)	friend (9)
Friendville	generally	lent	November
pens	percent (2)	percentage	sense
sentence (2)	spent	tendency	them (2)
then (7)	trend	twentieth	twenty (11)
Wendy's	went (30)	when (9)	

The categorization in these tables is obviously rough but still seems to provide some indication of a pattern. Thus it appears that backed variants occur most frequently before nasals and /l/ (for example we often hear schwa-like pronunciations in *friend*,

percent, and *November* as well as *smell*, *help*, and *else*). The pre-nasal environment is clearly the most favorable one for backing, with 93 tokens occurring in a wide variety of lexical items. Phonetically, backing might be predicted in this environment on accoustic grounds since the spectral profile of the vowel can be influenced by the addition of a nasal formant which may lead to the perception of increased centralization. As for the backing before /l/, the high frequency of this tendency seems to be due primarily to its common occurrence in a single item, *well*, which appeared with a backed vowel 41 times. This raises the possiblity that this item is a lexical exception and is not really indicative of a phonological trend. While this may be the case, I should also note that, in general, backing of /ɛ/ is quite common before /l/ and has been reported for other dialects of English (e.g. Norwich as described by Trudgill (1974)). In this phonological environment backing might be explained in articulatory terms as assimilative, with the vowel approaching the back position of the velarized /l/.

Table 2(b): Distribution of lowered variants of (e)

Voiceless Stops (n=14)			
better	connected	kept	met
Mexican	Mexico (4)	second (2)	Texas (2)
textbooks			
Voiced Stops (n=4)			
ahead	ed	red	tread
Voiceless Fricatives (n=8)			
definitely	lessons	nephews	rest
semester (2)	test (2)		
Voiced Fricatives (n=10)			
every	everybody	everyday	everyone (2)
everything (3)	never	together	
Lateral /l/ (n=7)			
bell	fell	personnel	tell
twelve	well (2)		
Nasals (n=3)			
offenses	ten	then	

Table 2(c): Distribution of lowered + backed variants of (ɛ)

Voiceless Stops (n=1)
upset

Voiced Stops (n=0)

Voiceless Fricatives (n=3)
dress guess left

Voiced Fricatives (n=4)
everybody everything (3)

Lateral /l/ (n=5)
help (2) helping well (2)

Nasals (n=4)
defensive remember ten went

The distribution of the backed tokens of (ɛ) (Table 2(b)) can be contrasted with that of the lowered tokens. While this vowel is lowered occasionally before nasals and /l/, this tendency is much less common in these items than is backing. Interestingly, what was one of the least common environments for backing, namely before voiceless stops, is the most common environment for lowering and results in pronunciations of items like *Texas*, *Mexico*, and *kept* with an [æ]-like quality. The suggestion that this envirionment may play a role in conditioning lowering rather than backing is strengthened by a re-examination of those relatively few cases where this vowel is backed before voiceless stops, since in all but three of these items the vowel is preceded by either an /l/ an /r/ or a /w/, each of which might be expected to promote backing as an accoustically or articulatorily assimilative consequence. The distribution of the variants that were both lowered and backed is also provided in Table 2(c), though with so few tokens no clear pattern is discernable yet for these items.

3.2. The (I) Variable

Turning our attention now to another vowel, the high front /I/, we find that here too there is more variation than is predicted by Figure 1. In addition to the lowering tendency indicated by that diagram, this vowel also exhibits a fondness for backing and sometimes these two directions are combined to produce a schwa-like variant. Thus, in terms of directionality, the variation for the (I) class is very similar to that seen with the (ɛ) class. This similarity extends to the relative frequencies of the variants as shown in Table 3, the format of which is the same as for Table 1.

Table 3: Frequency of shifted (I) variants (total n=1,108).

	[I˃]	[I˟]	[I˂]	Total
number:	52	14	33	99
% of all (I):	4.7 %	1.3 %	3.0 %	8.9 %
% of shifted:	52.5 %	14.1 %	33.3 %	

The first thing to note about the shifting of (I) is that it is relatively uncommon as compared with the shifting for (ɛ). As you can see, only 99 tokens out of the 1,108 coded were shifted, which gives an overall shifting rate of just under 9%, considerably lower that the 30% rate at which the (ɛ) variable appears shifted. Despite their relative infrequency, the innovative variants of the (I) class are distributed in a pattern quite similar to that seen for (ɛ) . Thus, as it did with the (ɛ) variable, the backing tendency predominates with (I) accounting for over half (52.5%) of all shifted tokens. Unlike with (ɛ) however, the next most common (I) variant was the one that is both lowered and backed, which was shown by one third of the shifted tokens. Straight lowering was pretty rare appearing in just 14 cases, a finding that is somewhat surprising given that this is supposed to be the principal direction of change according to standard accounts of the NCS.

Table 4(a): Distribution of backed variants of (I)

Voiceless Stops (n=24)			
bit	it	little (17)	pity
six (2)	stitches	trip	
Voiced Stops (n=8)			
big	did (2)	didn't	kids
Madrid (2)	middle		
Voiceless Fricatives (n=7)			
commission	different (2)	district	enlisted
if	list		
Voiced Fricatives (n=7)			
deliver	his	live (2)	lived
living (2)			
Lateral /l/ (n=4)			
built	children	will	willed
Nasals (n=2)			
since	finished		

Table 4(b): Distribution of lowered variants of (I)

Voiceless Stops (n=7)			
admit	committee (3)	fit	pretty
strict			
Voiced Stops (n=2)			
did	kids		
Voiceless Fricatives (n=1)			
fifth			
Voiced Fricatives (n=0)			
Lateral /l/ (n=1)			
will			
Nasals (n=3)			
fringe	in	Virginia	

Table 4(c): Distribution of lowered + backed variants of (I)

Voiceless Stops (n=6)			
chicken	clippings	equip	grips
little	strict		
Voiced Stops (n=13)			
did (4)	figure	kids (7)	sibling
Voiceless Fricatives (n=3)			
Christmas	difference	with	
Voiced Fricatives (n=1)			
business			
Lateral /l/ (n=6)			
build	children (4)	village	
Nasals (n=4)			
dinner	gym	in	since

When we look at the lexical distribution of the (I) variants, which is presented in Tables 4(a-c), we find the situation is quite messy and no obvious pattern of phonological conditioning has emerged. Backing of this vowel was found to be most common before voiceless stops, though this result may be skewed by the frequency of the single item, *little*, which accounted for 17 of the 24 tokens. For this item as well as others like *live*, *list*, *trip*, and *Madrid*, the backing may be due to the liquid consonant that precedes the vowel rather than the environment following the vowel.

As for the lowering in the (I) class (Table 4(b)), there are too few tokens to establish any real pattern, though I might note the possible influence of nasals on this tendency. In addition to the three cases of lowered (I) that preceded a nasal (viz. *fringe*, *in* and *Virginia*) we see that 4 of the 7 pre-voiceless stop tokens had nasals preceding the vowel. Once again we might look to a perceptual explanation for this finding. Accoustically lowering makes sense in nasal environments as the nasal formant interacts with F1 to create the perception of a

lowered vowel. Therefore, this environment may turn out to play a conditioning role once more data are analyzed.

The distribution of the variant of (I) that is both lowered and backed (Table 4(c)) appears to be equally opaque. It was found most commonly before voiced stops as in *kids* and *sibling*, but this may have been an idiosyncrasy, as all 13 of those tokens were produced by a single speaker. The factors that seem to be conditioning the distribution of the other variants for the (I) class may also be operating here. Thus, adjacent liquids seem to promote this shifting as evidenced by the appearance of this variant in *clippings* and *strict* as well as *build* and *village*. Also, the use of this combination variant in items such as *gym*, *dinner* and *since*, raises the possibility that following nasals are influential here just as they seemed to be in the case of straight lowering.

3.3. The (ʌ) Variable

The final variable to be discussed is the mid central (ʌ) which according to standard descriptions undergoes backing and rounding in the NCS. This expected variant has been observed in the present study, but as with (I) and (ɛ) a lowered variant and one that is both lowered and backed have also been recorded. Frequency data on this variation is provided in Table 5.

Table 5: Frequency of shifted (ʌ) variants (total n=1,000).

	[ʌ˃]	[ʌ̝]	[ʌ˅]	Total
number:	56	23	11	90
% of all (ʌ):	5.6 %	2.3 %	1.1 %	9.0 %
% of shifted:	62.2 %	25.6 %	12.2 %	

As Table 5 shows, shifting of this vowel is not very common, occurring in just 9% of the 1,000 tokens examined, a rate very similar to that shown by (I). Also similar to the (I) variation, as well as to that of (ɛ), is the finding that backing is the predominant direction of change, occuring in over 62% of the innovative tokens. Lowering in the (ʌ) class was roughly twice as common as the combination of lowering and backing, a ranking close to that seen for (ɛ) and unlike that of (I) where

the combination variant was more common than the lowered one.

Table 6(a): Distribution of backed variants of (ʌ)

Voiceless Stops (n=34)			
bucks	but (13)	buttons	couple
cups	cuts	much (7)	touch
up (8)			
Voiced Stops (n=2)			
club	studies		
Voiceless Fricatives (n=4)			
must	stuff	us (2)	
Voiced Fricatives (n=3)			
governor	love	other	
Lateral /l/ (n=1)			
colors			
Nasals (n=12)			
bunch	come (2)	coming	done
fun	funny	hundred	once
run	some	younger	

Table 6(b): Distribution of lowered variants of (ʌ)

Voiceless Stops (n=4)			
cut	indestructible	up (2)	
Voiced Stops (n=0)			
Voiceless Fricatives (n=6)			
stuff (6)			
Voiced Fricatives (n=4)			
brother	cousins	husbands	mother
Lateral /l/ (n=0)			
Nasals (n=9)			
drunk	fun (4)	once	one (3)

Table 6(c): Distribution of lowered + backed variants of (ʌ)

Voiceless Stops (n=3)
couple (2) cut

Voiced Stops (n=0)

Voiceless Fricatives (n=3)
stuff us (2)

Voiced Fricatives (n=1)
mother

Lateral /l/ (n=0)

Nasals (n=4)
funny lunches once some

As we turn to the lexical distribution of the variants of (ʌ) which is presented in Tables 6(a-c), once again our attempts to find conditioning patterns are hampered somewhat by the paucity of evidence. Still, a few observations can be made. The first concerns the distribution of the backed variant. The most frequent environment for this variant was before voiceless stops; however, it should be noted that the majority of these cases (26 of the 34) were found in just three items, *but*, *up* and *much*. We might explain the perceived backing in these words as a consequence of the lip rounding for the adjacent bilabial, an explanation that would hold for many other items on the list including *couple*, *club* and *bunch*.

Backing of this vowel was also quite frequent before nasals. This finding is interesting given that a similar propensity was observed for the (ɛ) variation. This shared tendency may strengthen the argument that these changes are related in the causal manner that the chain shift model posits. However, there seems to be a little rain looming over the chain shift parade when we consider the data on the other variants of (ʌ), since both the straight lowered and the lowered plus backed variants also occur quite commonly before nasals. This makes the connection to the (ɛ) variation seem a little less direct, because, as we recall from Tables 2(a-c), these

tendencies were fairly uncommon when the (ɛ) vowel appeared before nasals.

4. Some Implications

By way of conclusion I would like to consider briefly the implications of these findings for the interpretation of the Northern Cities pattern of change. While the vowels discussed in this paper are supposed to be participating in a chain shift, the argument that the variation they display constitutes a coordinated series of changes is certainly made less compelling by the appearance of alternative trajectories like those described here. For example, Labov (1994:195) suggests that the changes affecting /ɪ/ and /ɛ/ form a drag chain in which the high vowel was dragged down into the vacancy left by the shifting /ɛ/. If the primary direction of movement for the /ɪ/ class is backing, however, its connection to the /ɛ/ change is much less obvious. Similarly, when described as backing changes, the movements of /ɛ/ and /ʌ/ appear to be linked in a push chain where the /ʌ/ class retreats to maintain its distance from the approaching /ɛ/ items (Labov (1994:195), but this scenario can not explain the lowering tendencies observed for these vowels.

It should also be noted that, rather than serving to preserve perceptual distinctions as most elements in a traditional chain shift are supposed to do, the lowering tendencies of /ɛ/ and /ʌ/ may actually endanger some distinctions. The lowered variants of /ɛ/ approach an area of vowel space that is occupied not only by unshifted variants of the low front /æ/ but also by fronted variants of /ɑ/. Similarly, the lowered variants of /ʌ/ may achieve an [ɑ]-like quality which places them acoustically close to both unshifted /ɑ/ items and fronted tokens of /ɔ/.

While the directional ambiguity of the NCS changes seems to weaken the chain shift argument, there is, I think, some sense in which the case for the connectedness of these elements is bolstered by these findings. It might, for example, be argued that what this evidence shows is that a pattern of variation has been generalized to three phonologically related vowels. The pattern allows for these items to undergo backing, lowering or both under certain conditions which are not yet fully understood. The parallel in the behavior of these vowels is

made greater by the relative frequencies of the shifted variants, since for all three backing is more common than lowering and, except in the case of (I), straight lowering is more common than the combination of lowering and backing. Still, the finding that these changes are related in some phonological way, does not mean they are participating in a chain shift. It may instead indicate they are driven by parallelism and only incidentally come to resemble a chain when limited aspects of the whole picture are observed. Whether this suggestion will be confirmed by further research of course remains to be seen. In any event, the data discussed here signal a need to look beyond the simplified pattern of Figure 1 and consider the full range of variation available to Northern Cities speakers.

References

Eckert, Penelope (1991). "Social polarization and the choice of linguistic variants," in P. Eckert,ed., *New Ways of Analyzing Sound Change*, 213-32.

Labov, William (1994). *Principles of Linguistic Change, Vol. 1: Internal Factors*. Oxford: Blackwell.

Labov, William, M. Yaeger and R. Steiner (1972). *A Quantitative Study of Sound Change in Progress*. Philadelphia: U.S. Regional Survey.

Trudgill, Peter (1974). *The Social Differentiation of English in Norwich*. Cambridge: Cambridge University Press.

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